

Notice of Allowability

Application No.

09/930,572

Examiner

John Rivell

Applicant(s)

PINKHAM, LOUIS V.

Art Unit

3753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed 10/29/04 and oath/amendment filed 12/2/05.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☒ The drawings filed on 01 May 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date 05012009 (correct)
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date 11142005.
7. ☒ Examiner's Amendment/Comment
8. ☐ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows in order to correct the procedural deficiencies in the amendment to the specification filed October 29, 2004 and in the supplemental amendment to the claims filed December 2, 2005. Specifically, the use of double bracketing and strikethrough for the deletion of subject matter in the specification and the use of double bracketing for the deletion of subject matter from the claims does not conform to 37 CFR 1.173(d). In addition, during the interview of November 14, 2005 with Mr. Won Joon Kouh, the below amendment to the claims was discussed and agreed to. The supplemental oath filed December 2, 2005, required by the Examiner during the interview, is intended to cover all amendments below.

IN THE SPECIFICATION:

Please amend the last paragraph ending at line 50 of column 1 as follows:

Fluid can flow through the prior art valve assembly 10 depicted in FIG. 1A in any one of the three directions depicted in FIGS. 1B-1D. The fluid flow is represented by arrows 25 in these figures. In FIG. 1B, which represents the forward product flow through the column, valve 14a is opened allowing the fluid to flow from the process piping into the valve assembly 10. Valve 16a is also opened allowing the fluid to flow into the chromatography column (not shown). The fluid returns from the chromatography column passing through valve 16b and reentering the valve assembly.

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The fluid leaves the valve assembly passing through valve 14b on its path back to the process piping. Valves 12a and 12b remain closed during this process. According to the reverse process flow depicted in FIG. 1C, fluid entering the valve assembly 10 from the process piping can flow through valves 12a and 16b into the column, returning from the column through valve 16a, and exiting the valve assembly through valve [12a] 12b back through the process piping. Valves 14a and 14b remain closed during this process. The column may be bypassed altogether according to the process flow depicted in FIG. 1D, where the liquid entering into the valve assembly from the process piping encounters opened valves 12a, 14a, 12b and 14b, exiting the valve assembly without entering the chromatography column which remains inaccessible by closing valves 16a and 16b.

Please amend the fifth full paragraph of column 3 starting at line 24 as follows:

FIG. 3B is an enlarged cross-sectional view through line [A—A] 3B-3B of FIG. 3A;

Please amend the last paragraph of column 3 starting at line 36 as follows:

Referring to FIG. 2, there is shown a perspective view of the instant invention chromatography valve assembly 30. The valve assembly 30 comprises a unitarily formed valve body 32, which may be cast or machined from iron, bronze, stainless steel or aluminum, or may be molded from a suitable plastic or plastic composite material. The outer body 32 is generally that of an octahedral pyramid having a octagonal base 34, a square top surface 36, and a combination of triangular 35 and distorted hexagonal 48 side faces. The top square surface 36 is planar and mounted thereon is the first of

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five manual bonnet assemblies 38,39,40,41,42 for manually controlling the operation of the underlying valves. The operation of manual bonnets in diverter valve assemblies is well known to those skilled in the art, and is explained, for example, in afore-described U.S. Pat. No. 5,273,075, the specification of which is incorporated herein by reference. It should be noted that although manual bonnet assemblies are shown, other means such as pneumatic or electrical actuators may be mounted on the outer valve body in order to control the valves, thereby eliminating the need for the manual bonnets. The manual bonnets as shown are affixed to the valve body via plates 44, each plate having four suitable screw-type fasteners 46. Extending downwardly and outwardly from each edge of the top square surface 36 of the valve body 32 is a distorted hexagonal side face 48, each side face being planar and having a manual bonnet mounted thereon. These side faces are angled at approximately $[22^\circ \text{ (specifically } 22.21^\circ)]$ 30° with respect to the octagonal base of the valve body. The reason for the particular angled mounting of the additional four bonnet assemblies 39,40,41,42 has to do with valve drainage concerns, and will also be explained in detail later.

Please amend the paragraph starting at column 4, line 9 as follows:

Referring now to FIG. 3A, there is shown a top view of the valve assembly, minus the manual bonnets and with a partial cross-sectional view of the underlying channel network drawn in with broken lines. As can be seen in this figure, ports 50, 52, 54 and 56 are arranged at angles of approximately 90° with respect to each other on opposing ends of the octagonal base section of the valve assembly. Each port opens into a chamber in the valve assembly 30--port 50 opening into chamber 60, port 52 opening

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into chamber 62, port 54 opening into chamber 64, and port 56 opening into chamber 66. Fluid entering any of the ports encounters a chamber and channels leading to up to three diverter valves. Fluid entering port 52, for example, encounters chamber 62 and channels leading to two diverter valves 70 and 72. Where as fluid [Fluid] entering port 50, for example, encounters chamber 60 and channels leading to diverter valves 70, 76 and 78. The smooth and tortuous network of passageways that lead through the valve assembly connect the ports with the chambers and valves in a such a way that the valve assembly is fully drainable as will be later explained. The flow of the fluid is controlled by the diverter valves 70,72,74,76,78 and may be adjusted to permit specific flow directions which, in combination with the smooth and tortuous passageways, eliminate dead-legs from the system.

Please amend the third paragraph of column 4 starting at line 31 as follows:

Referring now to FIG. 3B, there is shown an enlarged cross-sectional view of the valve assembly through line [A—A] 3B-3B of FIG. 3A. As can be seen in the figure, port 50 opens into chamber 60. A passageway 55 leading to diverter valve 76 can also be seen in this figure. Chamber 60 is connected to chamber 64 via diverter valve 78. The passageway that connects these two chambers is inclined, rising sharply before encountering diverter valve 78 and then falling sharply after encountering the valve. The angle of inclination 63 measured from either side of the diverter valve 78 is approximately 30°. In chamber 64, a passageway 65 leading to diverter valve 74 can be seen. Finally in this figure, port 54 can be seen as opening into chamber 64.

Please amend the fourth paragraph of column 4 starting at line 44 as follows:

Referring now to FIG. 3C, there is shown an enlarged side elevational view of the instant invention valve assembly 30. This particular side elevational view is directed down port 50 which is disposed on triangular surface 35. As explained above, port 50 opens into chamber 60 which is connected by channels to diverter valves 70, 76 and 78. In this figure, diverter valves 70 and 76 can be seen on opposite sides of port 50, being disposed beneath the afore-described distorted hexagonal side faces 48. These diverter valves, as well as diverter valves 72 and 74 (not shown in this figure), are machined in the position of their drain angle which is approximately $[22^{\circ}$ (specifically 22.21°)] 30° as measured from the octagonal base of the valve assembly. This arrangement, coupled with the fact that valve 78 (as seen in FIG. 3B) is at a high point in the valve assembly, allows the valve assembly 30 to be fully and easily drainable. Ports 56 and 52 are also clearly visible in this figure.

IN THE CLAIMS:

2 (amended). The diverter valve assembly of claim 1, wherein said valve body comprises an octahedral pyramid structure having:

a substantially planar, octagonally shaped base portion;

a substantially planar square top surface;

four distorted hexagonal side faces projecting downwardly [form] from said square top surface; and

four triangular faces rising perpendicularly from said base portion, said triangular faces being disposed between said four side faces.

7 (amended). The diverter valve assembly of claim 6, wherein one of said five diverter valves is disposed at a predetermined high point in said valve body and the other four of said five diverter valves are disposed in said valve body at predetermined angles suitable for draining said valve assembly.

8 (amended). The diverter valve assembly of claim 7, wherein said angles are approximately [22°] 30°.

11 (amended). A diverter valve assembly for use in a liquid chromatography system, comprising:

- a unitarily formed valve body having a plurality of chambers and a tortuous network of passageways extending therethrough;

- at least one inlet port connected to one of said plurality of chambers for receiving the flow of a liquid into said [valves] valve assembly;

- at least one outlet port connected to one other of said plurality of chambers for allowing said liquid to exit said valve assembly;

- at least two additional ports connected to two other of said plurality of chambers for allowing the flow of liquid already in said valve assembly to exit and reenter said valve assembly without exiting into said chromatography system; and

- a plurality of diverter valves interposed between said plurality of chambers and ports, wherein fluid entering [any one] up to two of said ports encounters one of said chambers and sections of three of said channels which lead to three of said diverter valves thereby permitting a complete flushing of said valve assembly.

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13 (amended). A unitarily formed [The] diverter valve assembly for diverting the

flow of fluids in a liquid chromatography system comprising:

first, second, third, and fourth ports;

first, second, third and fourth chambers; and

first, second, third, fourth and fifth diverter valves;

wherein said first port is associated with said first chamber, said second port is associated with said second chamber, said third port is associated with said third chamber, and said fourth port is associated with said fourth chamber; and

wherein said first diverter valve is disposed between said first and said second chamber, said second diverter valve is disposed between said second and said third chamber, said third diverter valve is disposed between said third and said fourth chamber, said fourth diverter valve is disposed between said fourth and said first chamber, and said fifth diverter valve is disposed between said first and said third chamber.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Rivell whose telephone number is (571) 272-4918. The examiner can normally be reached on Mon.-Thur. from 6:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Blau can be reached on (571) 272-4406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "John Rivell", is positioned above the printed name.

John Rivell
Primary Examiner
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j.r.